



UNITED STATES PATENT AND TRADEMARK OFFICE

A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,886	02/10/2004	Naoto Matsunami	81940.0070	1418
26021	7590	09/30/2005	EXAMINER	
HOGAN & HARTSON L.L.P. 500 S. GRAND AVENUE SUITE 1900 LOS ANGELES, CA 90071-2611			HEIN, GREGORY P	
			ART UNIT	PAPER NUMBER
			2188	

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/775,886

Applicant(s)

MATSUNAMI ET AL.

Examiner

Gregory P. Hein

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on September 13, 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/25/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

RS

Status of Claims

Claims 1 – 25 are presented for examination and claims 1 – 25 are rejected.

Specification

The disclosure is objected to because of the following informalities: page 12 line 6 of the specification reads "...CPU 11009..." Examiner believes this should read "...CPU 11008..."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1. Claim 1 recites the limitation "a file" in line 10. It is unclear if this limitation is equivalent to "a file" in line 4.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1 – 16, 20, and 21 – 24 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Pre-Grant Publication 2003/0046270 by Leung et al.

2. For claim 1 Leung teaches:

A storage system that is coupled to at least one computer (Leung ¶23: lines 7 - 8), the storage system comprising:

a first interface control device that receives from the at least one computer an access request designating identification information of a file (Leung ¶31 lines 15 - 19);

a second interface control device coupling to the first interface control device (Leung ¶31 lines 15 - 19); and

a plurality of disks coupling to the second interface control device, wherein the plurality of disks include at least one first disk, and at least one second disk, the first disk and the second disk having different kinds of interfaces, the first interface control device decides based on identification information of a file received from the computer a

storage position of data of the file designated by the identification information of a file within the plurality of disks, and

the second interface control device controls to store the data of the file designated by the identification information of a file at the storage position decided by the first interface control device (Leung ¶23).

3. For claim 2 Leung teaches:

The at least one first disk is a Fibre Channel disk equipped with a Fibre Channel type interface, and the at least one second disk is a serial ATA disk equipped with a serial ATA type interface (Leung ¶25 line 10 teaches using a fiber channel protocol.)

4. For claim 3 Leung teaches:

A storage system comprising a memory, a memory controller for controlling the memory (Leung ¶38 lines 3 - 7), a plurality of first interface control devices each being coupled to the memory controller (Leung Fig. 2 shows a plurality of interface devices being coupled to a memory and a memory controller), and a plurality of second interface control devices each being coupled to the memory controller (Leung ¶31 lines 15 – 19 teach a plurality of ways to couple user computers to the data management server. Direct coupling requires an interface connection per user computer. Additionally, in lines 3 – 9 of the same paragraph Leung teaches NAS and SAN network interfaces to the Data Management Server. These two storage networks require a plurality of interface controllers to interface with the individual attached storage devices), wherein one of the first interface control devices receives identification information of a file and data of the file from the computer, and stores the data of the file in the memory, and one of the

second interface control devices that is coupled to one of the disks that is to store the data of the file controls to store the data of the file retained in the memory in the one of the disks according to the storage position of the data of the file decided by the first interface control device (Leung ¶29).

5. For claim 4 Leung teaches:

A first storage region exists in the at least one first disk, a second storage region exists in the at least one second disk, and the first interface control device sets up a first file system in the first storage region, and a second file system in the second storage region (Leung ¶43 lines 9 – 12. A file system is inherent when a storage location must be identified and data stored. Lines 5 – 7 of the same paragraph indicate a migration of data, which implicitly shows the existence of two file storage areas.)

6. For claim 5 Leung teaches:

The first interface control device decides, according to static property that is predetermined property and dynamic property that is property that changes with passage of time since a point of time when the file is created, as to which one of the first storage region and the second storage region to store the data of the file indicated by the identification information (Leung ¶59; 60; 61; 62; 63; 64; 65 line 1 and ¶68 lines 1 - 4).

7. For claim 6 Leung teaches:

The first interface control device controls to migrate data of a file stored in one of the first storage region and the second storage region to the other storage region according to a change in the dynamic property (Leung ¶43 lines 5 – 8 and ¶44 lines 21

– 26 and ¶45 lines 4 - 12), and changes identification information that specifies the file and information indicative of correlation between the file and the storage position (Leung ¶59 - 65 teach using file information to determine appropriate storage location. This information is subject to change and requires periodic adjustments. If the data is migrated after an evaluation the data and all corresponding information must also be updated.)

8. For claim 7 Leung teaches:

The static property includes at least one of information that specifies a kind of the file, information that specifies a time when the file is created, and information that specifies a value of the file (Leung ¶59; 64; 81), and the dynamic property includes at least one of information concerning an access property to the file, and information concerning passage of time elapsed since the file is created (Leung ¶64 and ¶75 lines 3 - 5).

9. For claim 8 Leung teaches:

A storage system that is coupled to a computer, the storage system comprising:
at least one first interface control device that couples to the computer and receives from the computer an access request containing identification information of a file (Leung ¶31 lines 15 - 19);

at least one second interface control device that couples to the at least one first interface control device (Leung ¶31 lines 15 - 19); and

a plurality of first disks each being coupled to the at least one second interface control device, wherein the at least one first interface control device couples to a second storage system having a plurality of second disks,

the plurality of first disks and the plurality of second disks have different kinds of interfaces (Leung ¶31 teaches attaching “storage area networks (SAN), network attached storage (NAS) (not shown), and others” to the data management server (DMS). It also allows for direct communication links such that the at least one first interface control is coupled to a plurality of storage devices. Additionally, it teaches using many different types of storage devices requiring the use of different types of interfaces).

a first storage region is set in the plurality of first disks,

a second storage region is set in the plurality of second disks (Leung ¶43 lines 9 – 12 teaches identifying volumes and locations within volumes to store data. This requires the existence of a file system. Additionally, data migration described on lines 5 – 7 of ¶43 requires more than one volume with a file system.),

the at least one first interface control device, upon receiving an access request from the computer, decides, according to property of a file designated by identification information contained in the access request received, as to which one of the first storage region and the second storage region to store data of the file (Leung ¶42),

when the data of the file is stored in the first storage region, the at least one second interface control device stores the data of the file in one of the plurality of first disks, and

when the data of the file is stored in the second storage region, the at least one first interface control device that received the access request from the computer controls such that the data of the file is transmitted to the second storage system through the at least one first interface control device that is coupled to the second storage system (Leung ¶42 lines 2 – 3 teach determining the location within a distributed network.)

10. For claim 9 Leung teaches:

The second storage system includes a third interface control device that receives an access request having identification information of a file, and that accesses a storage region within the second storage region correlated to the identification information received to thereby access data of the file specified by the identification information (Leung ¶31 teaches attaching NAS and SAN to the DMS. These storage subsystems have additional interface controllers. Storage subsystems multiply attached to the DMS as taught in Leung ¶34 lines 6 – 15 would have a second and a third interface controller each with a plurality of storage devices.)

11. For claim 10 Leung teaches:

The third interface control device sets a file system in the second storage region, and wherein, when the first interface control device receives an access request from the computer, and when data of a file designated by identification information contained in the access request is to be stored in the second storage region, the first interface control device controls to transmit the access request having the identification information correlated to the file to the third interface control device through the first

interface control device coupled to the second storage system (Leung ¶31 lines 3 - 19. The second storage system is communicatively attached to the first interface controller via a third interface controller. The data access request must be passed to the second storage system by way of the third interface controller.)

12. For claim 11 Leung teaches:

The first interface control device coupled to the second storage system receives an access request from the computer (Claim 9 is an inherent part of claim 10. The rejection of claim 10 is incorporated herein.)

13. For claim 12 Leung teaches:

The first interface control device migrates the data of the file from the first storage region to the second storage region through the third interface control device, based on property of files whose data is stored in the first storage region (Leung ¶43 teaches migration based on data property. The third controller is coupled to the first controller such that migrated data must pass to the third controller.)

14. For claim 13 Leung teaches:

When the first interface control device migrates data of a file stored in the first storage region to the second storage region, the first interface control device transmits to the third interface control device an access request having identification information correlated to the file, and stores the identification information of the file received from the computer correlated with the file system set in the second storage region. (Leung ¶59 - 65 teach using file information to determine appropriate storage location. This information is subject to change and requires periodic adjustments. If the data is

migrated after an evaluation the data and all corresponding information must also be updated.)

15. For claim 14 Leung teaches:

The first interface control device stores information concerning property of files and information concerning property of the first storage region and the second storage region, and decides, based on the information concerning property of files and the information concerning property of the first storage region and the second storage region, as to whether or not data of a file stored in the first storage region is to be migrated to the second storage region. (Leung ¶29 lines 7 - 12)

16. For claim 15 Leung teaches:

A storage system that is coupled to a computer, the storage system comprising:

a first interface control device that receives from the computer an access request having identification information for designating a file (Leung ¶34 lines 6 - 15);

a second interface control device that is coupled to the first interface control device (Leung ¶34 lines 6 - 15);

a plurality of first disks that are coupled to the second interface control device (Leung ¶31 lines 7 - 11);

a third interface control device that is coupled to a second storage system having a fourth interface control device that receives an access request containing address information indicating a storage position of data and having a plurality of second disks that are coupled to the fourth interface control device (Leung ¶31 lines 7 - 19 teach coupling various storage subsystems and components to an interface in the DMS. It

allows for the use of SAN and NAS allowing interface controllers interacting with individual storage devices and communicatively attached to an interface of the DMS as shown in Fig. 2 - **216**);

a first storage region existing in the plurality of first disks; and

a second storage region existing in the plurality of second disks (Leung ¶43 lines 9 – 12 teaches identifying volumes and locations within volumes to store data. This requires the existence of a file system. Additionally, data migration described on lines 5 – 7 of ¶43 requires more than one volume with a file system); wherein

the plurality of first disks and the plurality of second disks have different kinds of interfaces (Leung ¶31 lines 8 - 19),

the first interface control device, upon receiving an access request for a file from the computer, decides as to which one of the first storage region and the second storage region to store data of the file according to property of the file indicated by identification information contained in the access request received (Leung ¶42),

when the data of the file is stored in the first storage region, the second interface control device stores the data of the file in one of the plurality of first disks, and

when the data of the file is stored in the second storage region, the first interface control device controls to transmit to the fourth interface control device through the third interface control device the access request containing address information for an address within the second storage region where the data of the file is to be stored (Leung ¶31 teaches using various communication links to couple together various storage devices, networks and subsystems such that one interface connects a first

storage region and a second interface connects a different storage region creating a structure equivalent to that of claim 15.)

17. For claim 16 Leung teaches:

The third interface control device is an interface control device that corresponds to a block I/O interface. (Leung ¶22 lines 3 - 7)

18. For claim 20 Leung teaches:

A storage system that is coupled to a computer, the storage system comprising:

- a first node that receives from the computer an access request containing identification information of a file (Leung ¶27 lines 9 - 15);

- a second node that is coupled to at least one first disk (Leung ¶31 lines 15 – 19 teach direct coupling of a storage device to the DMS);

- a third node that is coupled to a second storage system having at least one second disk and a file I/O interface control device that receives an access request having identification information of a file;

- a fourth node that is coupled to a third storage system having at least one third disk and has a block I/O interface control device that receives an access request having address information of the file indicating a storage position of the file within the at least one third disk (Leung ¶31 teaches coupling NAS and SAN storage subsystems to the DMS. Leung exemplary Fig. 1 shows a SAN subsystem coupled to the DMS with a storage device attached); and

- a switch device coupled to the first node, the second node, the third node and the fourth node, wherein at least one of the first, second, and third disks has an interface

which is different from the interfaces of the other disks (Leung ¶31 and Fig. 31 teach a communication network allowing for the attachment of various storage devices as disclosed in Leung ¶31 lines 11 – 15. To address each storage device a switching mechanism in a communication network as shown in Fig. 1 a switching mechanism is required and is inherent to the system), and

wherein a first storage region exists in the at least one first disk, a second storage region exists in the at least one second disk, and a third storage region exists in the at least one third disk, and

the first node controls to store data of the file in one of the first storage region, the second storage region and the third storage region according to property of the file specified by identification information received from the computer (Leung ¶29 lines 7 – 12 disclose the DMS, interpreted to be node 1, controlling the storage of data into each storage region. The storage of data requires a file storage system within storage devices).

19. For claim 21 Leung teaches:

When the data of the file is stored in the first storage region, the second node controls to store the data of the file in a storage region in the at least one first disk (Leung ¶31 lines 8 – 10 and lines 15 - 16 teach that a storage device may be a RAID structure and that a storage device may be directly coupled to the DMS, respectively. In the case of a RAID structure additional processing constituting a second node is needed to determine stripe size and location).

20. For claim 22 Leung teaches:

When the data of the file is stored in the second storage region, the first node controls to transmit to the second storage system through the third node an access request containing identification information correlated to the file (Leung ¶31 lines 3 – 8 and Fig. 1 show various networks attached to the DMS. In order to access a storage device attached the access request must pass through the provisional communication node).

21. For claim 23 Leung teaches:

When the data of the file is stored in the third storage region, the first node controls to transmit to the third storage system through the fourth node an access request containing address information indicating a storage position of the data of the file. (Leung ¶31 lines 3 – 8 and Fig. 1 show various networks attached to the DMS. In order to access a storage device attached the access request must pass through the provisional communication node).

22. For claim 24 the rejection of claim 21, 22 and 23 are incorporated herein.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17, 18, 19, 21 and 25 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pre-grant publication 2003/0046270 Leung et al.

23. For claim 17:

Claim 17 teaches the first interface establishing a file system within the second block I/O storage system.

Leung discloses a server with a plurality of coupled computer user interfaces and a plurality of peripheral interfaces with coupled heterogeneous storage devices. Additionally, Leung discloses a processor with memory containing programs to handle data processing and management related to memory management.

Leung does not teach a data management server containing a program to establish a file system for the block oriented second storage system.

Leung seeks efficient data access while optimizing data storage resources (Leung Abstract). Moreover, Leung recognizes that block I/O data exists and is in common use (Leung ¶¶22 lines 3 - 7). Incorporating protocols for migrating data blocks may reduce overall access and migration time in addition make the system more compatible to a broader spectrum of storage devices. It would be obvious to one of ordinary skill in the art that with minimal changes, namely the introduction of a software program, to the structure disclosed by Leung the first interface controller can execute a program establishing a block oriented file system in the second storage system.

24. For claim 18:

The rejection of claim 17 is incorporated herein. As per the migration of claim 18 Leung teaches that the DMS determines the storage location of data. It is inherent with the structure that the data must pass through the third controller for storage in the second storage system.

25. For claim 19:

The rejection of claim 18 is incorporated herein. As per the updating of data during migration Leung ¶59 - 65 teach using file information to determine appropriate storage location. This information is subject to change and requires periodic adjustments. If the data is migrated after an evaluation the data and all corresponding information must also be updated.

26. For claim 21:

Claim 21 teaches a first node determining the appropriate storage region and the second node controlling storing data into a first storage region.

Leung discloses a Data Management Server (DMS) coupled to various networks and a plurality of heterogeneous storage devices. One arrangement allows for storage devices coupling directly to the DMS.

Leung does not disclose a second node controlling the storage of data into the first storage region. Leung does give a wide scope to the term storage device specifically disclosing the exemplary definitions "tapes, disk drives, optical disks, RAID structures, solid state storage and other types of computer readable media storage" (Leung ¶31 lines 8 - 11). It would be obvious to one of ordinary skill in the art that these types of storage require specific processing. Particularly, in a RAID structure the specific processing constitutes a second node such that the second node is controlling the storage into the first storage region.

27. For claim 25:

The claimed invention teaches a selecting from a plurality of storage hierarchies a particular storage hierarchy for each LU in a system. The interface controller sets the selected storage hierarchy.

Leung discloses a Data Management Server (DMS) that is “configured to perform processing to automate data store and manage data” in a distributed system.

Leung does not teach setting a particular storage hierarchy in a LU. Leung discloses that the operation of the DMS can be done by executing software modules. It would be obvious to one of ordinary skill in the art that software modules instructing the DMS to set a file storage system into a LU require no structural changes and minimal software changes to the current structure. Leung recognizes alternative embodiments that would require such a change. In ¶22 Leung recognizes a block data interface that may require new software modules and file storage arrangements.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory P. Hein whose telephone number is 571-272-4180. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2188

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregory Hein
September 13, 2005

Kevin L. Ellis
Primary Examiner

Kevin L. Ellis